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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/612,793 | 07/02/2003 | Arup Bhattacharyya | 1303.111US1 | 5437 |

21186 7590 02/13/2006

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| EXAMINER | |
|---|---|
| ERDEM, FAZLI | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2826 | |

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/612,793 | BHATTACHARYYA, ARUP | |
| | Examiner | Art Unit | |
| | Fazli Erdem | 2826 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on *21 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-53 and 72-79* is/are pending in the application.

4a) Of the above claim(s) *80-100* is/are withdrawn from consideration.

5)☒ Claim(s) *1-53 and 72-79* is/are allowed.

6)☒ Claim(s) *54-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/21/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 11/21/05 have been fully considered but they are not persuasive. Han discloses the require NDR device without the intrinsic region between the anode and the cathode regions. However, Coe in Fig. 1 discloses the intrinsic region made of alternating regions 11 and 12 situated between the anode and the cathode 21 and 23.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In response to applicant's arguments, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

### *Allowable Subject Matter*

1. Claims 1-53 and 72-79 allowed.

2. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 1 and 6, prior art failed to establish a memory cell having first diffusion region connected to bit line, a second diffusion region which store the memory state of the memory cell, a negative differential resistance diode with an intrinsic region between the anode and cathode to assist with stabilizing the memory stat of the memory cell, connected between the second diffusion region and the reference potential line.

Regarding Claims 7-53, prior art failed to establish a p-channel or n-channel access transistor with a first and second p or n-type diffusion region where the second p or n-type diffusion region store the memory state of the memory cell and a negative differential resistance n/i/p or p/i/n diode having n or p-type anode and cathode with an intrinsic region between the anode and cathode to assist with stabilizing the memory state of the memory cell.

Regarding Claims 72-79, prior art failed to establish a memory device with memory array, word lines, bit lines with access transistor with first and second diffusion regions, a negative differential resistance diode with an intrinsic region between the anode and the cathode where the memory cell is used to store charge in the second diffusion region .

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 54-71 rejected under 35 U.S.C. 103(a) as being unpatentable over Han (6,611,452) in view of Coe (4,754,310)

Regarding Claims 54-71, Han discloses reference cells fro TCCT based memory cells where a reference cell produces a voltage rise on a bit line that is proportional rise on a another bit line produced by a TCCT based memory cell in an "on" state. The reference cell includes an NDR device, a gate line device disposed adjacent to the NDR device, a first resistive element coupled between the NDR device and the bit line, and a second resistive element coupled between a sink and the bit line. Han fails to disclose the required intrinsic region requirement. However, Coe discloses a high voltage semiconductor device where in Fig. 1, the intrinsic region made up of alternating layers 11 and 12 is situated between anode and cathode 21 and 23.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required intrinsic region configuration in Han as taught by Coe in order to have a memory cell with higher performance.

***Conclusion***

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (571) 272-1914. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FE
February 5, 2006

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800